

XXIII.—On *Lütkenia*, a new Genus of *Ophiuroidea* from Discovery Bay. By Prof. P. MARTIN DUNCAN, M.B. Lond., F.R.S., &c.

[Plate IX.]

AFTER the Echinodermata brought to England by the late Arctic Expedition under the command of Sir George Nares, F.R.S. &c., had been described by Mr. Percy Sladen and myself*, a box of specimens, which had been collected by Mr. Hart, naturalist to H.M.S. 'Discovery,' was found unopened. It was sent from the Royal Society to the British Museum; and Dr. Günther, F.R.S., very kindly placed the Echinoderms in my hands. Mr. Edgar Smith, F.L.S., drew my attention to the two fine specimens which form the subject of this memoir; and after dissecting one I found it desirable to describe them under a new genus, which has very remarkable peculiarities.

Genus LÜTKENIA.

Disk notched, covered with very small scales. Radial shields small, widely separate. Mouth-papillæ numerous. Tooth-papillæ. Teeth resembling tooth-papillæ in double series, with accessory knobs. Generative slits small, midway between mouth-shields and margin. Accessory scales to tentacular openings; tentacle-scales numerous; on mid arm two. Spines small, distant, irregular. Lower arm-plates very broad and short within the disk, and small and triangular without. Side arm-plates meeting below throughout, but not above. Upper arm-plates broad and keeled near the disk.

Lütkenia arctica, sp. nov.

The disk is large, subcircular in outline, tumid above and at the sides, flat below, and is notched over the arms ($1\frac{4}{10}$ inch in diameter).

The arms are twice and a half as long as the disk is broad, come well within it, are very broad within the disk, and considerably so until the second third of their length. They are flat beneath, convex and almost keeled above near the disk, and less so distally, tall at the sides, and generally triangular in outline. The arm-spines are very small and few in number. The colour is white with a little brown.

The upper surface of the disk and the interbrachial spaces, to the aboral edge of the mouth-shields, and except the

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naked radial shields, have a stout flaccid derm covered with excessively minute scales. The radial shields are small, pear-shaped, narrow, and angular within, where they slightly overlap, and broad and curved without, with a free edge there; they are very distant, and bound the incision for the arm on either side ($\frac{2}{10}$ inch long). Many small scales, some elongate and others extremely small and oval, are situated between the radial shields and the arm. There are no radial scales with spines; and the generative plates are hidden.

The mouth-shields are small ($\frac{3}{20}$ inch long), about as broad as long, somewhat pentagonal, broadest without, angular within, the aboral edge being nearly straight. The sides of the shields are rather straight and are at right angles to the aboral margin for some space, and then they slope inwards to the oral point. An accessory plate exists, in some, between the oral angle of the mouth-shield and the side mouth-shields. The madreporic plate is cribriform.

The side mouth-shields are rather large, do not unite closely within, are long and rectangular, being widest at the side angle of the mouth-shield, where they are more or less pointed, curved, and rounded off.

The generative slits are short and linear; the edges are close together, and have on them small, flat, rounded spinules, sixteen or more on each; they are distant from the mouth-shields and from the margin of the disk; and a series of fine scales passes outwards from their distal end, by the side of the arm, to the margin. Other minute scales are in a patch on the oral side of the slits.

The jaws are rather long, stout, tumid and bossed, and form rather a sharp angle; and the lower edge of the jaw-plate is broad and stout; the angular spaces are wide and large; and the tentacles are very well developed.

There are mouth-papillæ and tooth-papillæ; and the teeth are in a double vertical series with some accessory knobs, so that they resemble large tooth-papillæ.

The mouth-papillæ are numerous, fourteen or fifteen to each angle, small, much joined together at their bases, irregular in size, shape, and number, short, and never very broad. At the apex of the angle, within the distinct jaw-plate, there are three principal and one or more smaller lowest tooth-papillæ. No satisfactory distinction, except that of position, can be made between these tooth-papillæ and mouth-papillæ. Above the three or more lowest tooth-papillæ the others are in a crowded vertical series. They are most numerous and small on either side; and there are six or seven pairs of large, long, pointed and irregular-shaped ones in the midst, and reaching

up the jaw-plate to its upper end, occupying the position of the teeth. The side of the jaws, close to the jaw-plate, is occasionally covered with small and close papillæ; and there is a small accessory papilla close to and at the side of the uppermost large ones. The upper part of the jaw beneath the stomach is stout and tumid, and the jaw-plate is large and well developed.

There are two rounded knobs on the side of the jaw, above the attachment of the mouth-papillæ, which are in relation with the upper tentacle; and the lower tentacle of the angle has five or six short unequal-sized tentacle-scales, forming, with several accessory scales, an obliquely placed curved wedge-shaped mass within the first lower arm-plate and on either side of its oral margin.

The lower arm-plates, there being six or seven within the disk, are mostly very broad and very short; further out they are small and triangular, with an aboral projection. They form but a small portion of the lower surface of the arm. The side arm-plates meet below, from the first to the last, giving a broad and comparatively flat under surface.

The first lower arm-plate is unlike the others in shape, and it is elliptical in outline and much broader than long: the second, longer and very much broader than the first, is somewhat rectangular; its sides are slightly incurved; and there is a central angular process on the distal and proximal edges, from which there is a reentering curve on either side to the lateral angles of the sides of the plate.

The third lower arm-plate is very broad, extending across the arm; it is short, the relation of length to breadth being one to three; the sides are incurved for the tentacle, and are slightly convex towards their distal angle. There is an angular process or cusp on the broad oral margin, and a smaller one on the aboral; and there is a reentering curve on both sides of the processes, giving a very elegant outline. The fourth lower arm-plate is as broad as the third; but it is shorter, and the proximal angular process is more decided than that on the distal edge. The next plate is of the same general shape, but is shorter, and the proximal angle is more pronounced. From this plate to the end of the arm, the others narrow more and more, become angular at the sides and more or less triangular as a whole, and are broader without than within. There is a projection in the median line on the aboral margin, and a reentering curve on either side to the lateral angles; and the proximal angular process has faintly reentering curves on either side of it. Far out and towards the tip of the arm the lower plates become more

quadrangular or diamond-shaped; they are small, broader than long, and there is an angular process without and within. At the tip the minute lower arm-plates have the distal edge curved; and they are angular orally.

The first lower arm-plate is separated from the side mouth-shields by several scales or plates which are continuous with the base of the tentacle-scales, already mentioned as being within and at the sides of the plate.

The second lower arm-plate has two or three small tentacle-scales on it. In some arms they are fused into one; or there may be several minute accessory scales present.

The third plate has the same number and accessory arrangement; and they are seen, more or less modified, in the fourth and fifth. The other lower arm-plates have no tentacle-scales.

The side arm-plates form much of the lower surface of the arms, and also the greater part of the sides in mid arm and towards the tip. All unite with their fellows along the median line below, and all are convex from side to side. The first, just touching its fellow in the median line, is oval in outline, broader than long; it supports five, short, closet entacle-scales on a curved base; and the tentacular opening is large and circular, having a rim of membrane. The second is broader than the first, touches its fellow, and has four tentacle-scales, and sometimes a fifth or a small accessory one.

The third side arm-plate, still broader than long, and not much longer than the second, touches its fellow by a longitudinal short and straight line. The margin without is curved boldly, and within very slightly; like the others it is flat below; and it has three tentacle-scales, the outer one being subspiniform. The fourth, still broader, is not longer; and its outer end is large and supports three tentacle-scales, one of which is sometimes wanting. The fifth plate is the broadest, is short and narrow towards the median line, where it has two small tentacle-scales close together; and there is a spinule external to them, and sometimes a second.

Between the tentacle-scales of these first five or six tentacles and the generative slit there are occasionally one or two spinules.

Towards the mid arm, the side arm-plates are tumid at the sides, nearly flat below, broader than long, and shortest where they are joined longitudinally. They have a sharp bend to reach the side of the arm, and terminate above in an angular edge by joining the outer edges of two upper arm-plates. Their distal margin, at the side of the arm, is thick, and supports two very small, distant, irregular, sharp, short spines

and two tentacle-scales, the inner of which is small and scale-like; and the outer is usually, but not invariably, a minute spine longer than the scale and the other spines. Sometimes the two tentacle-scales are equal, and further out the largest spine becomes independent of the tentacle. There are often no spines, while some plates have several very minute ones. All are very ill-developed and small.

The side arm-plates form the bulk of the tip of the arm; but although convex at the sides and swollen above, they do not separate the small and somewhat elongated hexagonal upper arm-plates there.

The upper arm-plates, within the notch in the disk, are four in number, and are broad, short, and curved to form a convex roof-like surface. Until far out on the arm, all are much broader than long, and have slanting straight sides and very faintly curved distal and proximal margins; the plates are convex and angular longitudinally, and they form the upper and much of the side arm. A little beyond the mid arm the upper arm-plates are smaller, not much broader than long, broadest without, where they are curved; and further out they are longer than broad, narrow proximally, with sides reenteringly curved and the distal margin boldly curved without. Towards the tip the elongated hexagonal form is assumed, the distal edge being, however, curved irregularly.

Remarks.—Two specimens of this fine Ophiuroid were collected by Mr. Hart: one is in spirit, and the other is dry, in the British Museum; and they both have the same anatomical details.

The minutely scaled disk, the widely separated radial shields and their free aboral edge, the position and ornamentation of the generative slit, the presence of mouth- and tooth-papillæ, the absence of true teeth in the ordinary sense, the papillose nature of the jaws, the accessory scales to the tentacular openings, the shape of the lower arm-plates, the numerous tentacle-scales and few spines on the side arm-plates, and the angular roof-shaped upper arm-plates, whilst they partly suggest Amphiuran and Ophioglyphan affinities as a whole, cannot admit the forms under any described genus. The absence of spined generative and radial scales and the presence of tooth-papillæ separate the new forms from *Ophioglypha*; and the nature of the dental apparatus and tentacle-scales prevents their being placed in any hitherto known arctic genus.

There is, then, an evident necessity for the foundation of a new genus, as these forms are unlike any others. I have named it after Prof. Lütken.

EXPLANATION OF PLATE IX.

- Fig. 1. *Lütkenia arctica*, from above. Natural size.
 Fig. 2. *Lütkenia arctica*, from below. Natural size.
 Fig. 3. Mouth-shield, side mouth-shields, jaw-angles, and mouth-papillæ and tooth-papillæ. Magnified 2 diameters.
 Fig. 4. Tooth-papillæ, from below and obliquely. Magnified 2 diam.
 Fig. 4 a. Representatives of the teeth, from above. Magnified 2 diam.
 Fig. 5. Lower arm-plates and side arm-plates. Magnified 2 diam.
 Fig. 6. Side arm-plates and spines. Magnified 2 diam.
 Fig. 7. Upper arm-plates. Magnified 2 diam.

BIBLIOGRAPHICAL NOTICE.

A Manual of Zoology for the Use of Students, with a General Introduction on the Principles of Zoology. By HENRY ALLEYNE NICHOLSON, M.D., D.Sc., M.A., Ph.D., F.R.S.E., F.G.S. Fifth Edition, revised and enlarged. Svo. Blackwoods; Edinburgh and London, 1878.

WE welcome the appearance of this new edition of Prof. Nicholson's 'Manual of Zoology,' of some previous issues of which we have had occasion to speak in terms of praise. As a general systematic treatise on the structure and classification of animals it is the best that we possess; and the author's industry has enabled him in the present edition, which is much enlarged, to improve his work very greatly. Still the work is rather a manual of animal morphology for the use of students than a treatise on zoology in the broad sense of the term; but we must be thankful for what we get, and it must be confessed that it would be impossible, even within the limits of the present enlarged volume, to combine an equally satisfactory account of the organization, development, and structure of animals with a good sketch of their relations to each other and to the outer world. In this latter particular we are nevertheless glad to see that Prof. Nicholson has now gone further than in previous editions. The increase in the number of pages is considerable; but besides this the author has further gained space by printing certain portions of his work in small type.

In its general arrangement this edition differs so little from its predecessors as not to require any detailed notice. On nearly every page, however, we find traces of alterations made in consequence of recent researches in different branches of zoology: the chapters on Sponges and Hydroids and on Entozoa seem to have received great additions; and the results of the recent investigations of the American palæontologists upon the rich accumulations of vertebrate remains found in their Secondary and Tertiary rocks have led to considerable additions being made to the chapters on Vertebrata. We notice that that most unnatural group, the Annuloida, still figures as a primary division of the animal kingdom; let us hope that it will disappear from the next edition, as its founder may be considered to have already given it up.